

acid salt and a sulfuric acid salt of zinc or zinc and magnesium. Claim 24 has been similarly amended in scope with the amendments to claim 1.

Claim 38, however, has been amended to recite that the anion A in the general formula (1) of claim 1 is limited to species described in originally filed claims 6-9. It is further clarified that the composite metal polybasic salt containing anions other than the sulfuric acid anion is obtained by ion-exchange with the sulfuric acid ion.

New claim 43 recites a method for preparing the composite polybasic salt of claim 38, which does not contain sulfuric acid anions, i.e. contains carbonic acid, silicic acid, organopolycarboxylic acid and phosphoric acid ions. Support can be found in claims 6-9, 11 and 38.

No new matter within the meaning of § 132 has been added by any of the amendments.

Accordingly, Applicants respectfully request the Examiner to enter the amendments, reconsider the rejections in view of remarks and claim amendments and allow all claims pending in this application.

1. Rejection of Claims 1-2, 11, 16-20, 24-27 and 31-42
under 35 U.S.C. § 102(b) or in the alternative 35 U.S.C. § 103(a)

The Office Action rejects claims 1-2, 11, 16-20, 24-27 and 31-42 under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over U. S. Patent No. 4,454,244 ("Woltermann"). The Office Action states:

No distinction is seen between the process and composition disclosed in Woltermann, and that recited in applicant's claims. Regarding claim 11, Woltermann discloses in Example 1 that a slurry of zinc oxide and aluminum nitrate in water was heated at a temperature of 90°C at a pH of 3.6 to 4.0. No distinction is seen between this process, and the process steps recited in applicant's claim 11. The composition produced according to the method of Woltermann would inherently exhibit the diffraction peaks as recited in applicant's claim 1, since the composition is prepared in the same manner. Regarding claim 16, Woltermann discloses in the sentence bridging columns 1 and 2 that the composition may contain magnesium as a divalent metal. Regarding claims 19 and 20, Woltermann discloses at column 2, lines 6-11 that the anion in the composition may be carbonate or sulfate. Regarding claims 31-42, the composition of Woltermann is considered to constitute an additive for resins, a heat insulator, or an anion-exchanger.

Applicants respectfully traverse the rejection because Woltermann does not teach each and every claimed limitation of the amended claims. Woltermann fails to inherently or expressly teach the novel crystalline structure of the presently claimed salts.

Specifically, Woltermann fails to teach that a polybasic salt undergoing the claimed process conditions or having the recited limitations exhibit a single X-ray diffraction (Cu- α) in the region where $2\theta = 33$ to 50° . Woltermann also fails to teach that an anion A of a polybasic salt of the general formula (1) is sulfuric acid salt or that the sulfuric acid salt anion can undergo ion-exchange to produce carbonic, silicic, organocarboxylic or phosphoric acid ion.

None of these claimed limitations are expressly or inherently taught by Woltermann. Moreover, the presently claimed feature of a single diffraction peak exhibited by the novel crystalline structure of the claimed salts is completely unexpected and thereby rebuts the alleged *prima facie* case of obviousness.

1. The presently claimed invention is not anticipated by Woltermann.

Turning first to the question of anticipation, Applicants note that the Federal Circuit has spoken clearly and at some length on the question of anticipation. Anticipation requires that each and every element of the claimed invention be disclosed in a single prior art reference. Verdegaal Bros. v. Union Oil Co. of California, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Those elements must be expressly disclosed as in the claim. In re Bond, 15 USPQ2d

1566 (Fed. Cir. 1990).

The prior art reference must also be enabling, thereby placing the allegedly disclosed matter in the possession of the public. In re Brown, 329 F.2d 1006, 1011, 241 USPQ 245, 249 (C.C.P.A. 1964). In order to accomplish this, the reference must be so particular and definite that from it alone, without experiment or the exertion of his own inventive skill, any person versed in the art to which it pertains could construct and use it. Id. at 250.

In the present application, independent claim 1 recites a composite metal polybasic salt having a chemical composition represented by the following general formula (1),



wherein M^2 is a divalent metal other than Zn, M^3 is a trivalent metal, **A is a sulfuric acid ion**, and a, b, x, y and z are numbers satisfying the following formulas,

i) $0 \leq a, 0 < b$

ii) $3x + 2(a + b) - y - mz = 0$ (wherein m is a valency of anion A),

iii) $0.3 \leq (a + b)/x \leq 2.5$,

iv) $1.5 \leq y/(x + a + b) \leq 3.0$, and

v) $4.0 \leq (x + a + b)/z \leq 20.0$, and

n is a number of not larger than 7, exhibiting diffraction peaks at $2\theta = 2$ to 15° , $2\theta = 19.5$ to 24° , **a single**

peak at $2\theta = 33$ to 50° , and a single peak at $2\theta = 60$ to 64° in the X-ray diffraction (Cu- α).

Woltermann, on the other hand, merely discloses a very general teaching of composite polybasic salts that in no way discloses the novel crystalline structure of the presently pending claims. In particular, Woltermann fails to provide any teaching regarding the specific combination of Zn and Mg in the general formula (1) $M_a^2Zn_bM_x^3(OH)_y(A)_z \cdot nH_2O$ other than by exemplifying Zn and Mg as possible divalent metals.

Woltermann also fails to teach that an anion A of a polybasic salt of the general formula (1) is sulfuric acid salt or that the sulfuric acid salt anion can undergo ion-exchange to produce carbonic, silicic, organocarboxylic or phosphoric acid ion. None of the Examples of Woltermann teach that the anion is a sulfuric acid ion or the exchange of ions with other anions.

Although the presently claimed polybasic salt has a chemical composition resembling the hydrotalcite of Woltermann, the presently claimed polybasic salt has a crystalline structure which is completely new and different from the hydrotalcite of Woltermann. In particular, the presently claimed polybasic salt has a novel crystalline structure exhibiting single peaks in a region where 2θ is 33 to 50° and in a region where 2θ is 60 to 64° as presently claimed. See Fig.'s 2 and 3 of the specification.

The hydrotalcite of Woltermann, on the other hand, exhibits a plurality of X-ray diffraction peaks in these regions. See Fig. 6 and Comparative Example 2.

Clearly, the polybasic salt is not inherently or expressly disclosed by the teaching of Woltermann. There is nothing in the cited reference that would have enabled one of ordinary skill in the art to make the specifically claimed novel crystalline structure from the laundry list of components provided in Woltermann.

Accordingly, Applicants respectfully submit that the presently claimed invention is not anticipated by Woltermann and respectfully request the Examiner to reconsider and withdraw the § 102(b) rejection.

2. The presently claimed invention is unobvious over Woltermann.

Turning to the question of obviousness, Applicants respectfully traverse this rejection because the Office Action fails to establish all three prongs necessary for a *prima facie* case of obviousness. Specifically, the prior art does not provide any suggestion or motivation to combine Zn and Mg and further fails to teach that an anion A is sulfuric acid. Even assuming *arguendo* that a *prima facie* has been established, Applicants rebut the

presumption with evidence of unexpected results. In particular, the presently claimed invention unexpectedly provides a completely new crystalline structure exhibiting single X-ray diffraction peaks in a region where 2θ is 33 to 50° and in a region where 2θ is 60 to 64° .

Turning to the rule, the Federal Circuit held that a *prima facie* case of obviousness must establish: (1) some suggestion or motivation to modify the references; (2) a reasonable expectation of success; and (3) that the prior art references teach or suggest all claim limitations. Amgen, Inc. v. Chugai Pharm. Co., 18 USPQ2d 1016, 1023 (Fed. Cir. 1991); In re Fine, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988); In re Wilson, 165 USPQ 494, 496 (C.C.P.A. 1970).

A *prima facie* case of obviousness must also include a showing of the reasons why it would be obvious to modify the references to produce the present invention. See Ex parte Clapp, 277 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985). The Examiner bears the initial burden to provide some convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings. Id. at 974.

Even if a *prima facie* case of obviousness has been established, secondary considerations such as commercial success, long felt but unsolved need, failure of others, and unexpected results may nevertheless give rise to a patentable invention.

Graham v. John Deere Co., 148 U.S.P.Q. 459 (1966). Where the claimed and prior art products are substantially similar, a *prima facie* case of obviousness can also be rebutted by demonstrating that the prior art products do not possess the characteristics of the claimed invention. In re Best, 196 U.S.P.Q. 430, 433 (C.C.P.A. 1977).

In the present application, independent claim 1 recites a composite metal polybasic salt having a chemical composition represented by the following general formula (1),



wherein M^2 is a divalent metal other than Zn, M^3 is a trivalent metal, **A is a sulfuric acid ion**, and a, b, x, y and z are numbers satisfying the following formulas,

i) $0 \leq a, 0 < b$

ii) $3x + 2(a + b) - y - mz = 0$ (wherein m is a valency of anion A),

iii) $0.3 \leq (a + b)/x \leq 2.5$,

iv) $1.5 \leq y/(x + a + b) \leq 3.0$, and

v) $4.0 \leq (x + a + b)/z \leq 20.0$, and

n is a number of not larger than 7, exhibiting diffraction peaks at $2\theta = 2$ to 15° , $2\theta = 19.5$ to 24° , **a single peak at $2\theta = 33$ to 50°** , and a single peak at $2\theta = 60$ to 64° in the X-ray diffraction (Cu- α).

Woltermann, on the other hand, fails to satisfy the first and second prongs of the *prima facie* case because Woltermann merely discloses a very general teaching of composite polybasic salts that does not disclose the novel crystalline structure of the presently pending claims or provide any suggestion to modify the components for any specific purpose. Woltermann simply fails to provide any teaching regarding the specific combination of Zn and Mg in the general formula (1) $M_a^2Zn_bM_x^3(OH)_y(A)_z \cdot nH_2O$ other than by exemplifying Zn and Mg as possible divalent metals. Nothing in Woltermann discloses the desirability of pairing Zn and Mg with each other as is presently claimed in the general formula (1) of pending claim 1.

Woltermann also fails to teach that an anion A of a polybasic salt of the general formula (1) is sulfuric acid salt or that the sulfuric acid salt anion can undergo ion-exchange to produce carbonic, silicic, organocarboxylic or phosphoric acid ion. None of the Examples of Woltermann teach that the anion is a sulfuric acid ion or the exchange of ions with other anions.

Any admonition that it would have been "obvious to try" to vary the components to arrive at a new crystalline structure is improper because in some cases, what would have been "obvious to try" would have been to vary all parameters or try each of numerous choices until one possibly arrived at a successful result. Since Woltermann does not provide any indication that the claimed

limitations result in a new crystalline structure or provide any guidance, it would not have been obvious to try to make the presently claimed invention incorporating the claimed limitations. See In re O'Farrell, 853 F.2d 894, 903, U.S.P.Q.2d 1673, 1681 (Fed. Cir. 1988).

Accordingly, a *prima facie* case of obviousness has not been established. Woltermann cannot be applied against the presently claimed invention and there simply is no suggestion in the prior art at the time the invention was made that the claimed limitations result in a novel crystalline structure. However, even assuming that a *prima facie* case has been established, the presently claimed invention achieves unexpected results over Woltermann insofar as the presently claimed single peaks in a region where 2θ is 33 to 50° and in a region where 2θ is 60 to 64° further unexpectedly result in an excellent additive for resins, heat insulator and anion exchanger.

Clearly, the polybasic salt is not obvious over the teachings of Woltermann. There is nothing in the cited reference that would have motivated one of ordinary skill in the art to make the specifically claimed novel crystalline structure from the laundry list of components provided in Woltermann.

Accordingly, Applicants respectfully submit that the presently claimed invention is unobvious over Woltermann and respectfully

request the Examiner to reconsider and withdraw the § 103(a) rejection.

2. Rejection of Claims 21-23 and 28-30
under 35 U.S.C. § 103(a)

The Office Action rejects claims 21-23 and 28-30 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,454,244 ("Woltermann"). The Office Action states:

Woltermann is relied upon as discussed hereinbefore. The specific anions recited in these claims would be prima facie obvious over Woltermann, since Woltermann discloses at column 2, lines 7 and 8 that the anion is an anion "such as" nitrate, chloride, carbonate, sulfate and so on. Accordingly, Woltermann contemplates the use of any suitable anion, and it would be within the skill of one of ordinary skill in the art to determine suitable anions which could be employed as the anion in the composition of Woltermann, other than nitrate, chloride, sulfate or carbonate.

Applicants respectfully traverse this rejection for essentially the same reasons as provided supra. However, Applicants add that the Office Action fails to provide any convincing line of reasoning which would lead the ordinarily skilled artisan to modify the reference to derive the subject matter as defined in the subject claims. In particular, while Woltermann may contemplate the use of any suitable anion, and it would be within the skill of one of ordinary skill in the art to

determine suitable anions which could be employed as the anion in the composition of Woltermann, no convincing line of reasoning exists for one of ordinary skill to modify the teachings to arrive at the presently claimed novel crystalline structure exhibiting single X-ray diffraction peaks in a region where 2θ is 33 to 50° and in a region where 2θ is 60 to 64°.

Woltermann further fails to provide any teaching regarding the specific combination of Zn and Mg in the general formula (1) $M_a^2Zn_bM_x^3(OH)_y(A)_z \cdot nH_2O$ other than exemplifying Zn and Mg as possible divalent metals. Nothing in Woltermann discloses the desirability of pairing Zn and Mg with each other as is presently claimed in the general formula (1) of pending claim 1.

Turning to the rule, the Federal Circuit held that in addition to establishing the elements of the *prima facie* case, the Office Action must also include a showing of the reasons why it would be obvious to modify the references to produce the claimed invention. See Ex parte Clapp, 277 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985). Notably, the Examiner bears the initial burden to provide some convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings. Id. at 974.

With respect to the rejections over the particular species of the anions, Applicants note that rejection is moot since Woltermann

is not a proper rejection over the independent claims. However, Applicants note for purposes of the record that Woltermann fails to teach an anion A of a polybasic salt of the general formula (1) undergoing ion-exchange to produce carbonic, silicic, organocarboxylic or phosphoric acid ion. While it may be within the skill of one of ordinary skill in the art to determine suitable anions which could be employed as the anion in the composition of Woltermann, nothing suggests the anion exchange properties of the specific combination of Zn and Mg in the general formula (1) $M_a^2Zn_bM_x^3(OH)_y(A)_z \cdot nH_2O$.

Again, Applicants respectfully submit that the presently claimed invention is unobvious over Woltermann and respectfully request the Examiner to reconsider and withdraw the § 103(a) rejection.

**3. Rejection of Claims 1-2, 11, 16-20, 24-27 and 31-42
under 35 U.S.C. § 102(e) or under 35 U.S.C. § 103(a)**

The Office Action rejects claims 1-2, 11, 16-20, 24-27 and 31-42 under 35 U.S.C. § 102(e) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 6,071,433 ("Bhattacharyya"). The Office Action states:

No distinction is seen between the process and composition disclosed by Bhattacharyya, and

that recited in applicant's claims. Regarding claim 11, Bhattacharyya discloses a method for producing a hydrotalcite-like clay containing zinc and aluminum. (See column 3, line 41 - column 5, line 52). Bhattacharyya discloses in Example 1 that a pH of 10.6, which was then adjusted to 8.25, was utilized at a temperature of 85°C. No distinction is seen between this process, and the process steps recited in applicant's claim 11. The composition produced according to the method of Bhattacharyya would inherently exhibit the diffraction peaks as recited in applicant's claim 1, since the composition is prepared in the same manner. Regarding claim 16, Bhattacharyya teaches at column 4, lines 20 and 21 that magnesium may function to control the acidity or basicity of the catalyst. Regarding claims 19 and 20, Bhattacharyya discloses at column 4, lines 25-31 that the anion in the composition may be carbonate or sulfate. Regarding claims 31-42, the composition of Bhattacharyya is considered to constitute an additive for resins, a heat insulator, or an anion-exchanger.

Applicants respectfully traverse the rejection because Bhattacharyya does not teach each and every claimed limitation of the amended claims. Bhattacharyya fails to inherently or expressly teach the novel crystalline structure of the presently claimed salts and further fails to teach the same process steps as presently claimed. In particular, Bhattacharyya fails to teach that a polybasic salt undergoing the claimed process conditions or having the recited limitations exhibit a single X-ray diffraction (Cu- α) in the region where $2\theta = 33$ to 50° or that an anion A of a polybasic salt of the general formula (1) is sulfuric acid salt or

that the sulfuric acid salt anion can undergo ion-exchange to produce carbonic, silicic, organocarboxylic or phosphoric acid ion. Still further, nothing in Bhattacharyya teaches or suggests that Zn and Mg are contained as divalent metals M^{2+} .

Clearly, none of these claimed limitations are expressly or inherently taught by Bhattacharyya. Moreover, the presently claimed feature of a single diffraction peak exhibited by the novel crystalline structure of the claimed salts is completely unexpected and thereby rebuts any alleged *prima facie* case of obviousness.

1. The presently claimed invention is not anticipated by Bhattacharyya.

Turning first to the question of anticipation, Applicants note that the Federal Circuit has spoken clearly and at some length on the question of anticipation. Anticipation requires that each and every element of the claimed invention be disclosed in a single prior art reference. Verdegaal Bros. v. Union Oil Co. of California, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Those elements must be expressly disclosed as in the claim. In re Bond, 15 USPQ2d 1566 (Fed. Cir. 1990).

The prior art reference must also be enabling, thereby placing the allegedly disclosed matter in the possession of the public. In re Brown, 329 F.2d 1006, 1011, 241 USPQ 245, 249 (C.C.P.A. 1964).

In order to accomplish this, the reference must be so particular and definite that from it alone, without experiment or the exertion of his own inventive skill, any person versed in the art to which it pertains could construct and use it. Id. at 250.

In the present application, independent claim 1 recites a composite metal polybasic salt having a chemical composition represented by the following general formula (1),



wherein M^2 is a divalent metal other than Zn, M^3 is a trivalent metal, **A is a sulfuric acid ion**, and a, b, x, y and z are numbers satisfying the following formulas,

i) $0 \leq a, 0 < b$

ii) $3x + 2(a + b) - y - mz = 0$ (wherein m is a valency of anion A),

iii) $0.3 \leq (a + b)/x \leq 2.5$,

iv) $1.5 \leq y/(x + a + b) \leq 3.0$, and

v) $4.0 \leq (x + a + b)/z \leq 20.0$, and

n is a number of not larger than 7, exhibiting diffraction peaks at $2\theta = 2$ to 15° , $2\theta = 19.5$ to 24° , **a single peak at $2\theta = 33$ to 50°** , and a single peak at $2\theta = 60$ to 64° in the X-ray diffraction (Cu- α).

Bhattacharyya, on the other hand, merely discloses a chemical composition of the polybasic salt represented by the following

formula, $[M^{2+}_{(1-x)}M^{3+}_x(OH)_2]^{x+}(A^{n-}_{x/n}) \cdot mH_2O$, which although appears to be similar fails to actually contain sulfuric acid ions or Zn and Mg as divalent metals M^{2+} . Contrary to the Office Action's assertion, Bhattacharyya does not teach the same process conditions because a nitrate is prepared first and compositions having anions are prepared from the nitrate. This is clearly different from the presently claimed invention which prepares a sulfate first, and then prepares compositions having other anions from the sulfate.

Bhattacharyya also fails to teach that an anion A of a polybasic salt of the general formula (1) is sulfuric acid salt or that the sulfuric acid salt anion can undergo ion-exchange to produce carbonic, silicic, organocarboxylic or phosphoric acid ion. None of the Examples of Bhattacharyya teach that the anion is a sulfuric acid ion or the exchange of ions with other anions. Although Bhattacharyya discloses in Example 1 that a pH of 10.6, which was then adjusted to 8.25, was utilized at a temperature of 85°C, the use of the newly amended claim 11 to contain sulfuric acid is seen to be a clear distinction. Despite having a slight resemblance in chemical composition with the hydrotalcite of Bhattacharyya, the presently claimed polybasic salt has a completely new and different crystalline structure.

Clearly, the polybasic salt is not inherently or expressly disclosed by the teaching of Bhattacharyya. There is nothing in

the cited reference that would have enabled one of ordinary skill in the art to make the specifically claimed novel crystalline structure from the laundry list of components provided in Bhattacharyya.

Accordingly, Applicants respectfully submit that the presently claimed invention is not anticipated by Bhattacharyya and respectfully request the Examiner to reconsider and withdraw the § 102(e) rejection.

2. The presently claimed invention is unobvious over Bhattacharyya.

Turning to the question of obviousness, Applicants respectfully traverse this rejection because the Office Action fails to establish all three prongs necessary for a *prima facie* case of obviousness. Specifically, the prior art does not provide any suggestion of motivation to combine Zn and Mg and further fails to teach that an anion A is sulfuric acid. Even assuming *arguendo* that a *prima facie* has been established, Applicants rebut the presumption with evidence of unexpected results. In particular, the presently claimed invention unexpectedly provides a completely new crystalline structure exhibiting single X-ray diffraction peaks in a region where 2θ is 33 to 50° and in a region where 2θ is 60 to

64°.

Turning to the rule, the Federal Circuit held that a *prima facie* case of obviousness must establish: (1) some suggestion or motivation to modify the references; (2) a reasonable expectation of success; and (3) that the prior art references teach or suggest all claim limitations. Amgen, Inc. v. Chugai Pharm. Co., 18 USPQ2d 1016, 1023 (Fed. Cir. 1991); In re Fine, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988); In re Wilson, 165 USPQ 494, 496 (C.C.P.A. 1970).

A *prima facie* case of obviousness must also include a showing of the reasons why it would be obvious to modify the references to produce the present invention. See Ex parte Clapp, 277 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985). The Examiner bears the initial burden to provide some convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings. Id. at 974.

Even if a *prima facie* case of obviousness has been established, secondary considerations such as commercial success, long felt but unsolved need, failure of others, and unexpected results may nevertheless give rise to a patentable invention. Graham v. John Deere Co., 148 U.S.P.Q. 459 (1966). Where the claimed and prior art products are substantially similar, a *prima facie* case of obviousness can also be rebutted by demonstrating that the prior art products do not possess the characteristics of

the claimed invention. In re Best, 196 U.S.P.Q. 430, 433 (C.C.P.A. 1977).

In the present application, independent claim 1 recites a composite metal polybasic salt having a chemical composition represented by the following general formula (1),



wherein M^2 is a divalent metal other than Zn, M^3 is a trivalent metal, **A is a sulfuric acid ion**, and a, b, x, y and z are numbers satisfying the following formulas,

i) $0 \leq a, 0 < b$

ii) $3x + 2(a + b) - y - mz = 0$ (wherein m is a valency of anion A),

iii) $0.3 \leq (a + b)/x \leq 2.5$,

iv) $1.5 \leq y/(x + a + b) \leq 3.0$, and

v) $4.0 \leq (x + a + b)/z \leq 20.0$, and

n is a number of not larger than 7, exhibiting diffraction peaks at $2\theta = 2$ to 15° , $2\theta = 19.5$ to 24° , **a single peak at $2\theta = 33$ to 50°** , and a single peak at $2\theta = 60$ to 64° in the X-ray diffraction (Cu- α).

Bhattacharyya, on the other hand, fails to satisfy the first and second prongs of the *prima facie* case because Bhattacharyya merely discloses a very general teaching of composite polybasic salts that does not disclose the novel crystalline structure of the

presently pending claims or provide any suggestion to modify the components for any specific purpose. Bhattacharyya simply fails to provide any teaching regarding the specific combination of Zn and Mg in the general formula (1) $M_a^2Zn_bM_x^3(OH)_y(A)_z \cdot nH_2O$. Nothing in Bhattacharyya discloses the desirability of pairing Zn and Mg with each other as is presently claimed in the general formula (1) of pending claim 1.

Bhattacharyya also fails to teach that an anion A of a polybasic salt of the general formula (1) is sulfuric acid salt or that the sulfuric acid salt anion can undergo ion-exchange to produce carbonic, silicic, organocarboxylic or phosphoric acid ion. None of the Examples of Bhattacharyya teach that the anion is a sulfuric acid ion or the exchange of ions with other anions.

Any admonition that it would have been "obvious to try" to vary the components to arrive at a new crystalline structure is improper because in some cases, what would have been "obvious to try" would have been to vary all parameters or try each of numerous choices until one possibly arrived at a successful result. Since Bhattacharyya does not provide any indication that the claimed limitations result in a new crystalline structure or provide any guidance, it would not have been obvious to try to make the presently claimed invention incorporating the claimed limitations. See In re O'Farrell, 853 F.2d 894, 903, U.S.P.Q.2d 1673, 1681 (Fed.

Cir. 1988).

Accordingly, a *prima facie* case of obviousness has not been established. Bhattacharyya cannot be applied against the presently claimed invention and there simply is no suggestion in the prior art at the time the invention was made that the claimed limitations result in a novel crystalline structure. However, even assuming that a *prima facie* case has been established, the presently claimed invention achieves unexpected results over Bhattacharyya insofar as the presently claimed single peaks in a region where 2θ is 33 to 50° and in a region where 2θ is 60 to 64° further unexpectedly result in an improved additive for resins, heat insulator and anion exchanger.

Clearly, the polybasic salt is not obvious over the teachings of Bhattacharyya. There is nothing in the cited reference that would have motivated one of ordinary skill in the art to make the specifically claimed novel crystalline structure from the laundry list of components provided in Bhattacharyya.

Accordingly, Applicants respectfully submit that the presently claimed invention is unobvious over Bhattacharyya and respectfully request the Examiner to reconsider and withdraw the § 103(a) rejection.

4. Rejection of Claims 21-23 and 28-30
under 35 U.S.C. § 103(a)

The Office Action rejects claims 21-23 and 28-30 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,071,433 ("Bhattacharyya"). The Office Action states:

Bhattacharyya is relied upon as discussed hereinbefore. The specific anions recited in these claims would be prima facie obvious over Bhattacharyya, since Bhattacharyya implies at column 4, lines 25-31 that the anionic species A may be any anion which would provide structural integrity by forming pillars or linkages between cationic layers of the clay. It would be within the skill of one of ordinary skill in the art to determine suitable anions which would meet this criteria of Bhattacharyya, other than those specifically listed at column 4, lines 25-31.

Applicants respectfully traverse this rejection for essentially the same reasons as provided supra. However, Applicants add that the Office Action fails to provide any convincing line of reasoning which would lead the ordinarily skilled artisan to modify the reference to derive the subject matter as defined in the subject claims. In particular, while Bhattacharyya may contemplate the use of any suitable anion, and it would be within the skill of one of ordinary skill in the art to determine suitable anions which could be employed as the anion in the composition of Bhattacharyya, no convincing line of reasoning

exists for one of ordinary skill to modify the teachings to arrive at the presently claimed novel crystalline structure exhibiting single X-ray diffraction peaks in a region where 2θ is 33 to 50° and in a region where 2θ is 60 to 64° .

Bhattacharyya further fails to provide any teaching regarding the specific combination of Zn and Mg in the general formula (1) $M_a^2Zn_bM_x^3(OH)_y(A)_z \cdot nH_2O$ other than exemplifying Zn and Mg as possible divalent metals. Nothing in Bhattacharyya discloses the desirability of pairing Zn and Mg with each other as is presently claimed in the general formula (1) of pending claim 1.

Turning to the rule, the Federal Circuit held that in addition to establishing the elements of the *prima facie* case, the Office Action must also include a showing of the reasons why it would be obvious to modify the references to produce the claimed invention. See Ex parte Clapp, 277 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985). Notably, the Examiner bears the initial burden to provide some convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings. Id. at 974.

With respect to the rejections over the particular species of the anions, Applicants note that rejection is moot since Bhattacharyya is not a proper rejection over the independent claims. However, Applicants note for purposes of the record that

Bhattacharyya fails to teach an anion A of a polybasic salt of the general formula (1) undergoing ion-exchange to produce carbonic, silicic, organocarboxylic or phosphoric acid ion. While it may be within the skill of one of ordinary skill in the art to determine suitable anions which could be employed as the anion in the composition of Bhattacharyya, nothing suggests the anion exchange properties of the specific combination of Zn and Mg in the general formula (1) $M_a^2Zn_bM_x^3(OH)_y(A)_z \cdot nH_2O$.

Despite the implication at column 4, lines 25-31 of Bhattacharyya that the anionic species A may be any anion which would provide structural integrity by forming pillars or linkages between cationic layers of the clay, Applicants note that this disclosure in no way points out the patentable features of the presently claimed composition. Simply providing a laundry list of species would not have enabled one of ordinary skill to make the presently claimed novel crystalline structure without undue experimentation. Disclosure of a large number of species cannot lead to the conclusion that every property of every possible permutation is inherently disclosed by such general teachings.

Accordingly, Applicants respectfully submit that the presently claimed invention is unobvious over Bhattacharyya and respectfully request the Examiner to reconsider and withdraw the § 103(a) rejection.


CONCLUSION

In light of the foregoing, Applicants submit that the application is now in condition for allowance. The Examiner is therefore respectfully requested to reconsider and withdraw the rejection of the pending claims and allow the pending claims. Favorable action with an early allowance of the claims pending is earnestly solicited.

Respectfully submitted,

SHERMAN AND SHALLOWAY

SHERMAN AND SHALLOWAY
413 N. Washington Street
Alexandria, Virginia 22314
703-549-2282


Attorney for Applicants
Roger C. Hahn
Reg. No. 46,376